IN THE FIELD

Field Museum
Member Magazine

Vol. 91, No. 2
Summer 2020

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ON THE COVER
This beautiful new species of *Hipposideridae* (Old World leaf-nosed bats) is known only from western Kenya, but could range far more broadly. We still know little about Afrotropical bats and a lot of what we are learning comes from Field Museum collections and scientists.

B. D. PATTERSON

Let us know your thoughts about *In The Field* magazine. Email your comments to ITF@fieldmuseum.org

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Dear Friends,

KYLE FLUBACKER PHOTOGRAPHY (2020)

(Above) Richard and Jan Lariviere

I pen my last letter to you as President and CEO of the Field Museum with hope.

As I write, your Museum has reopened, and we are happy to see you back in our halls. We have worked to make it a safe and enjoyable experience for all—with enhanced cleaning and social distancing protocols.

This has been an unprecedented time at the Field. To give you context, in the 99 years since moving to our current location, the Museum has never been closed for more than 3 days in a row. These 126 days of closure have tested our resolve and resilience in many ways. Throughout this period, many of you reached out with words of encouragement and stayed engaged with our science and scholars. Thanks to you, our scientific curiosity and love for the communities we serve never wavered.

The days ahead will bring more unknowns, I'm certain. With help from Museum Trustees and donors this month, we are launching a special fundraising campaign—*Field Forward*—to address the steep financial challenges ahead, (page 8). I hope you will join me as a donor to this urgent effort.

Jan and I are honored to be a part of the Field Museum family. It's been one of our greatest joys to see the Field grow into an exceptional place of discovery and shared ideas. We look forward to seeing it flourish under the leadership of my successor, Julian Siggers, PhD, who will join the Museum in September.

Thank you for all the ways you made my tenure at the Field the best job I've ever had. I wish you and your loved ones good health and many more years of natural history inquiry at the Field Museum.

With gratitude,

Richard W. Lariviere, PhD

President and CEO

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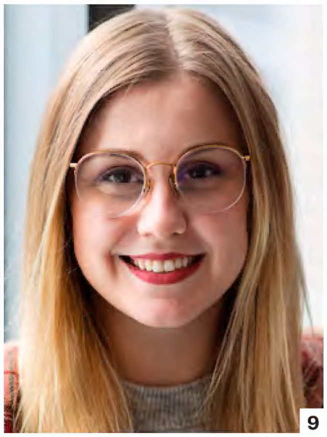
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WELCOME NEW TRUSTEES

The Field Museum's Board of Trustees are responsible for ensuring the capacity of the Museum to fulfill its mission today and for generations to come. Representing a cross-section of Chicago's civic, corporate, professional, and philanthropic communities, they provide leadership and oversight regarding strategic direction and financial resources. The Field graciously welcomes the following new members:

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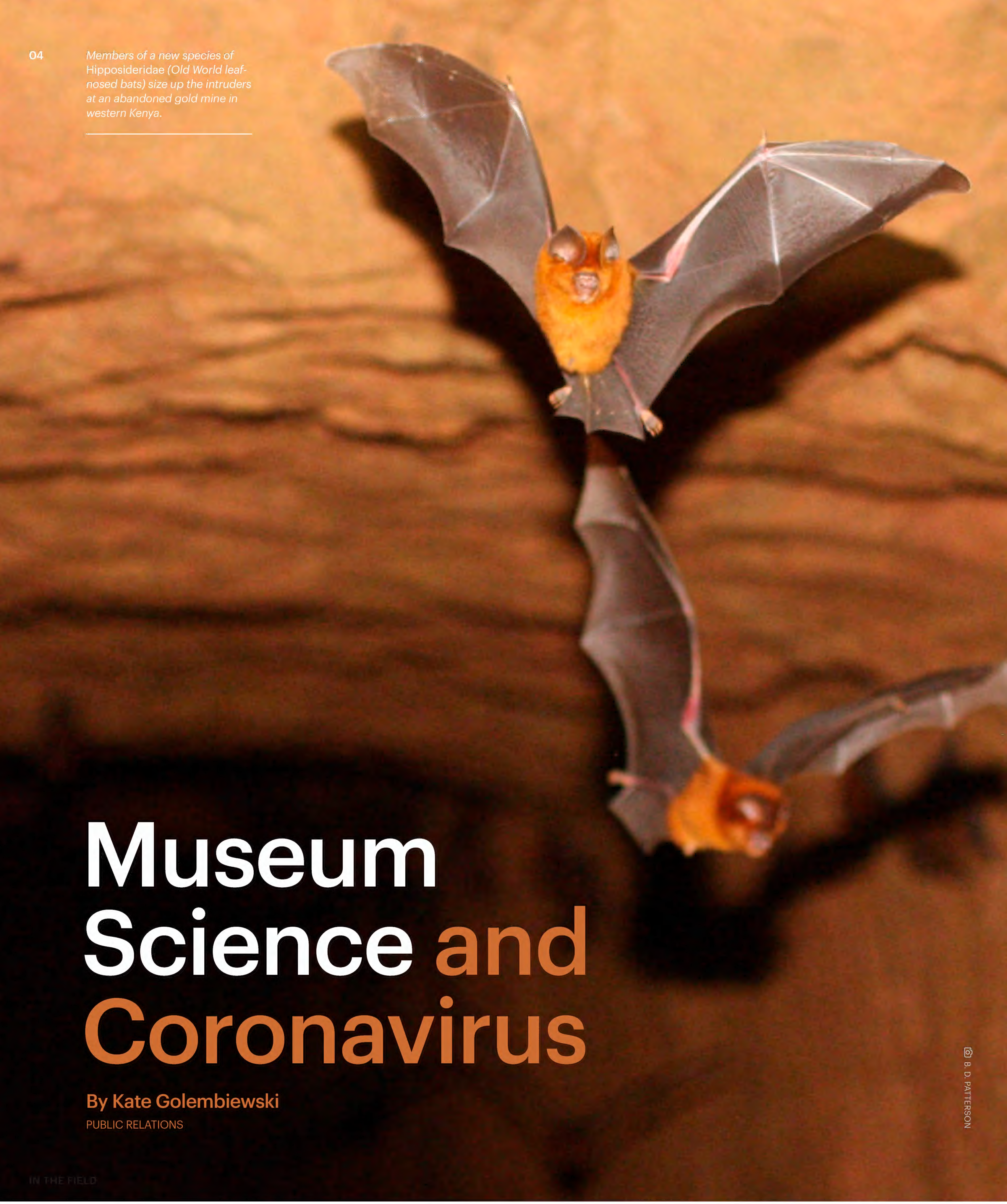


Members of a new species of Hipposideridae (Old World leaf-nosed bats) size up the intruders at an abandoned gold mine in western Kenya.

Museum Science and Coronavirus

By Kate Golembiewski

PUBLIC RELATIONS

B. D. PATTERSON

CORONAVIRUSES AND BATS HAVE BEEN EVOLVING TOGETHER FOR MILLIONS OF YEARS

Bats do a lot of good for the world—they pollinate plants, eat crop-destroying and disease-carrying insects, and disperse the seeds that regenerate tropical forest trees. Bats and a range of other mammal groups are also natural carriers of coronaviruses. To better understand this diverse family of viruses, which includes the specific coronavirus behind COVID-19, scientists compared the different kinds of coronaviruses living in 36 bat species from the western Indian Ocean and nearby areas of Africa. They found that different groups of bats at the genus and family levels had their own unique strains of coronavirus, revealing that bats and coronaviruses have been evolving together for millions of years.

"Developing a better understanding of how coronaviruses evolved can help us build public health programs in the future," said Steve Goodman, PhD, MacArthur Field Biologist and an author of a paper just released in *Scientific Reports* detailing the discovery. The study was led by Université de La Réunion scientists Léa Joffrin, PhD, and Camille Lebarbenchon, PhD, who conducted the genetic analyses focusing on emerging infectious diseases on islands in the western Indian Ocean.

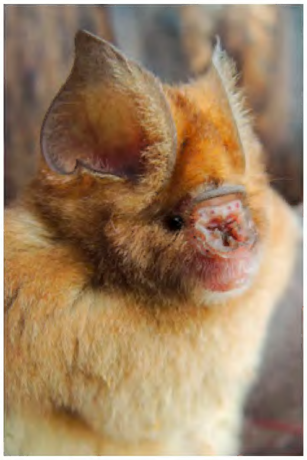
(Above) Among the bat species that tested positive in Madagascar for coronaviruses is Rousettus madagascariensis, *a fruit bat endemic to the island.*

OLIVÀ SANTARNI NOROALINTSEHENO

There are a vast number of different coronaviruses, potentially as many as bat species. While most pose no known threat, there's potential for them to be dangerous to other animals if the viruses have opportunities to jump between species. The coronaviruses carried by the bats studied in this paper are different from the one behind COVID-19, but by learning about coronaviruses in general, we can better understand the virus affecting us today.

Largely using bat specimens housed at the Field Museum, Goodman and his colleagues took samples from more than a thousand bats representing 36 species found on islands in the western Indian Ocean and coastal areas of Mozambique. The researchers ran genetic analyses of the coronaviruses present in these bats and compared the sequences with ones from other animals—including dolphins, alpacas, and humans—and were able to build a coronavirus family tree. This family tree shows how the different kinds of coronavirus are related to each other.

Learning how different strains of coronavirus evolved could be key for preventing future coronavirus outbreaks. "Before you can create programs for public health and try to deal with the possible shift of certain diseases to humans, or from humans to animals, you have to know what's out there. This is kind of the blueprint," said Goodman.



(Left) This new Kenyan species has for years masqueraded as Hipposideros caffer *(Sundevall's leaf-nosed bat), too similar in its anatomy to be distinguished without noting its DNA and vocalization differences.*

B. D. PATTERSON

NEW BAT SPECIES DISCOVERED—COUSINS OF THE ONES SUSPECTED IN COVID-19

Bats play a huge but poorly understood role in humans' lives. For most bats, we don't really know how they evolved, where they live, and how they interact with the world around them. That lack of knowledge can be dangerous—the more we know about bats, the better we're able to protect them and defend ourselves against animal-borne diseases. In a new paper in a special issue of the journal *ZooKeys* focused on the coronavirus pandemic, researchers announced the discovery of at least four new species of African leaf-nosed bats—cousins of the horseshoe bats that are the closest match for the virus that caused COVID-19.

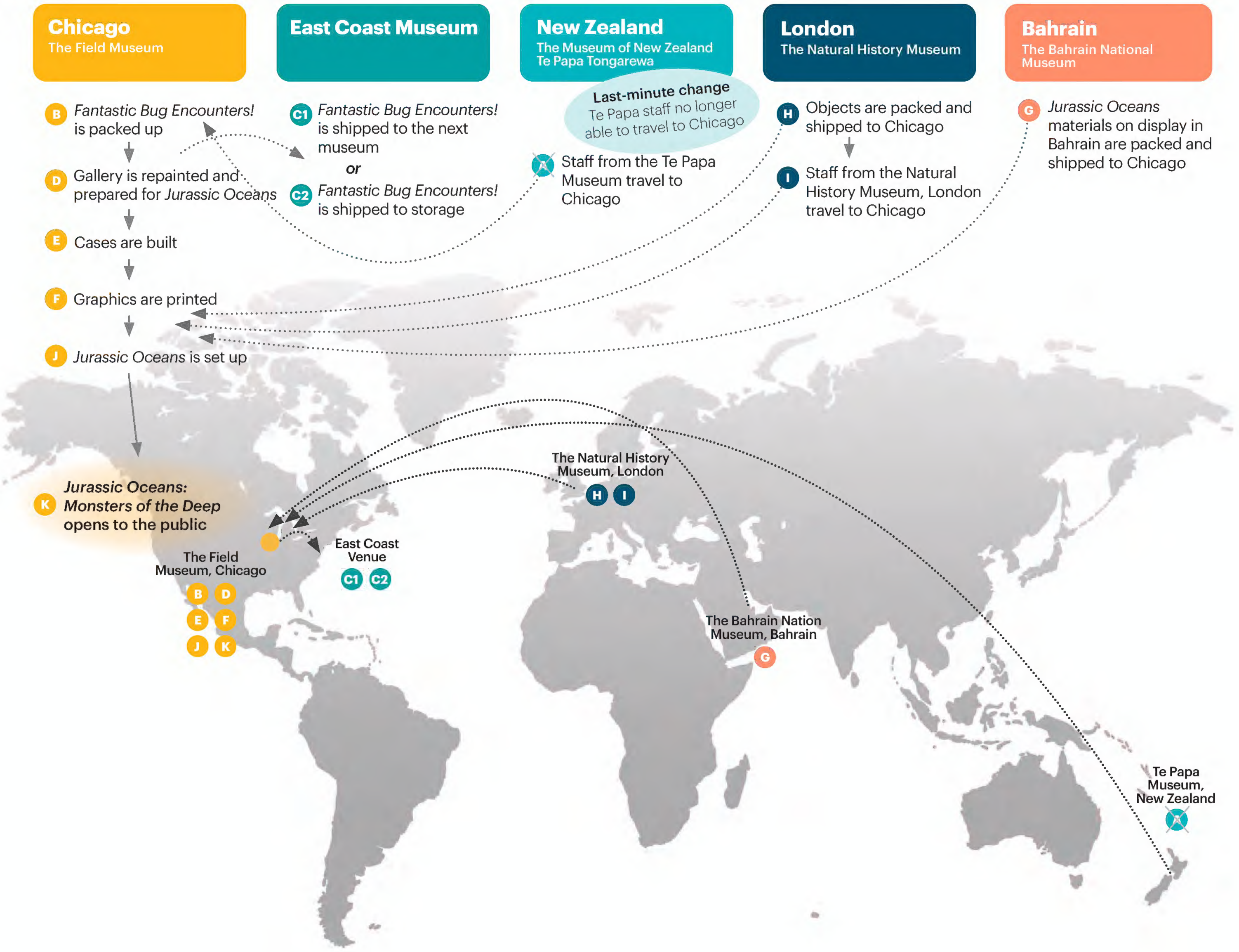
"With COVID-19, we have a virus that's running amok in the human population. It originated in a horseshoe bat in China. China has lots of bat species, but no one knows if bats or another kind of animal were involved in transmitting the virus to humans. We owe it to ourselves to learn more about them and their relatives," said Bruce Patterson, PhD, MacArthur Curator of Mammals and the paper's lead author.

"None of these African leaf-nosed bats carry a disease that's problematic today, but we don't know that that's always going to be the case," said Terry Demos, PhD, a post-doctoral researcher in Patterson's lab and a principal author of the paper.

To get a better understanding of how the leaf-nosed bats are distributed and related to each other, Patterson, Demos, and their colleagues at Kenya's Maasai Mara University and the National Museums of Kenya undertook a genetic study of African leaf-nosed bats almost entirely based on museum specimens collected in various parts of Africa. In several cases, supposedly widespread species proved to be at least four genetically distinct species that simply looked alike.

While these bats don't normally have much contact with humans, the more people destroy bats' habitats and expose themselves to bat species through hunting, the more likely it is that bats and other animals will spread viruses to people. "Unless you try to seek out bats, either to harass them or kill them, it's very unlikely that they'll infect you," said Demos.

The researchers emphasize that in addition to concerns that the bats could harm humans, we need to make sure that we don't harm bats in hopes of curbing disease. Patterson notes, "Bats have a place in nature and perform essential ecological functions, and we can't let our terror of COVID cause us to pull apart natural ecological systems."



Chicago
The Field Museum

B *Fantastic Bug Encounters!* is packed up

D Gallery is repainted and prepared for *Jurassic Oceans*

E Cases are built

F Graphics are printed

J *Jurassic Oceans* is set up

East Coast Museum

C1 *Fantastic Bug Encounters!* is shipped to the next museum

or

C2 *Fantastic Bug Encounters!* is shipped to storage

New Zealand
The Museum of New Zealand Te Papa Tongarewa

Last-minute change
Te Papa staff no longer able to travel to Chicago

A Staff from the Te Papa Museum travel to Chicago

London
The Natural History Museum

H Objects are packed and shipped to Chicago

I Staff from the Natural History Museum, London travel to Chicago

Bahrain
The Bahrain National Museum

G *Jurassic Oceans* materials on display in Bahrain are packed and shipped to Chicago

K *Jurassic Oceans: Monsters of the Deep* opens to the public

The Natural History Museum, London
H
I
East Coast Venue
C1
C2
The Field Museum, Chicago
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The Bahrain Nation Museum, Bahrain
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Te Papa Museum, New Zealand
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FIELD MUSEUM, LORI WALSH

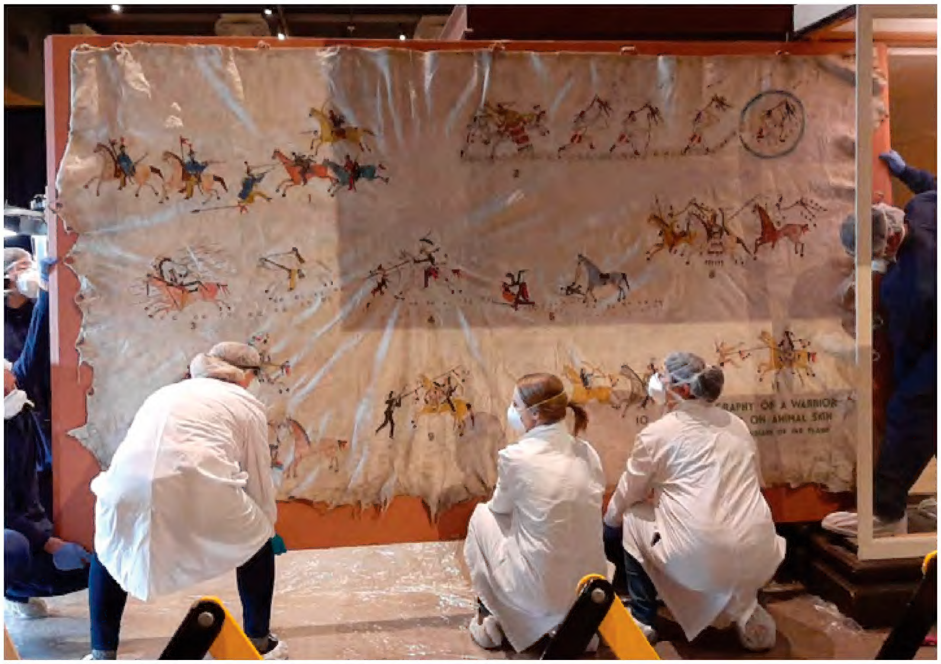
HOW EXHIBITIONS COME TOGETHER

BY SUSAN NEILL, EXHIBITIONS PLANNING DIRECTOR AND **EMILY PARR**, EXHIBITIONS PROJECT MANAGER

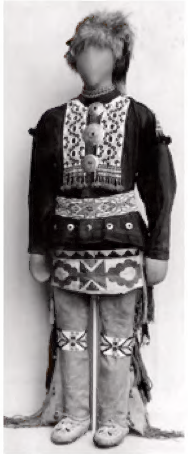
Visitors to any new exhibition embark on journeys of discovery. If we've done our jobs well, they have fun and learn great science stories. Few probably give much thought to what occurred after the previous exhibition was shuttered, before the doors reopened to the current one. But the global pandemic—which stalled production on our upcoming exhibitions and interrupted movement of traveling exhibitions between museums—provides an opportunity to show how interconnected the world of Field Museum exhibitions truly is.

Our exhibitions are collaborations by planners, content developers, content experts, designers, installers, and other specialists. The logistics are an intricate choreography. In order to make way for *Jurassic Oceans: Monsters of the Deep*, the fall exhibition that was rescheduled to 2022 because of our closure, Holleb Hall must be reconfigured. That work can only begin once the gallery is empty. Due to travel restrictions, staff from the Te Papa Museum in New Zealand are unable to work alongside the Field's team to deinstall their *Fantastic Bug Encounters!* exhibition. Instead, they must supervise the work remotely, via video call, across 17 time zones.

In London, the Natural History Museum's closure interrupted *Jurassic Oceans* specimen preparation and crate construction. As restrictions are lifted around the world, teams will resume work on disparate schedules. Our British colleagues must pack and ship specimens to Chicago, and ensure their materials recently displayed in Bahrain are also headed our way. Meanwhile, Field Museum staff will finish building display cases and produce graphics. Gallery walls will be moved and painted. In the final weeks before opening—yet to be determined—cases will be positioned, graphics installed, interactives tested, specimens carefully placed in their mounts, and lighting adjusted. Only then will the doors open on the highly-anticipated world premiere of *Jurassic Oceans: Monsters of the Deep.*



STEPHANIE HORNBECK

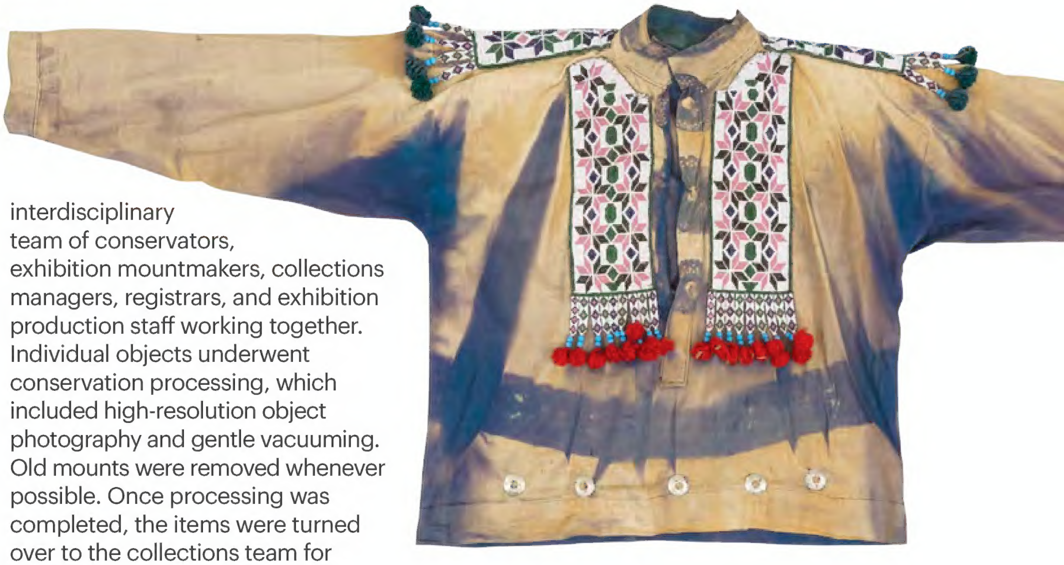


A92755 / FIELD MUSEUM (1949)

(Far left) Field Museum staff deinstall the Silver Horn tipi liner from the Native North America Hall. (Catalog Number 96796).

(Left) The Menominee shirt as it looked when it was first installed in 1949.

(Below) Many of the cultural materials from the Hall had been on display for almost 70 years and have conservation issues of varying severity. When this Menominee shirt was deinstalled, the team discovered that, while it appears tan, its original color was a dark indigo blue. The discoloration was caused by continuous exposure to light. (Catalog Number 155877).



FIELD MUSEUM

NATIVE NORTH AMERICA HALL

BY STEPHANIE HORNBECK,
MCCARTER CHIEF CONSERVATOR,
ANTHROPOLOGY, GANTZ FAMILY
COLLECTIONS CENTER

In January 2020, a conservation, collections, and exhibitions team deinstalled the last item from the Native North America Hall—the painted tipi liner commissioned by the Field Museum from Kiowa artist Silver Horn in 1904. The hall is currently undergoing renovation to prepare it for a new Native North America exhibition, which will open in late 2021.

In August 2018, after a blessing in the hall, the object-deinstallation process began. For the next 17 months, Assistant Conservators Erin Murphy and Nicole Passerotti (Seneca, Bear clan) and Conservation Technicians J. Kae Good Bear (Navajo, Mandan & Hidatsa) and Ellen Jordan worked in close concert with Collections team members Katie Hillson (Osage Nation), Emily Starck, and Michelle Brownlee (Turtle Mountain Ojibwe) to properly remove and care for more than 1,500 items that were on view.

Forty-seven exhibition cases of diverse objects, including 44 mannequins, representing male and female dress and regalia from multiple tribes were deinstalled by gallery section in nine phases. Each phase involved an interdisciplinary team of conservators, exhibition mountmakers, collections managers, registrars, and exhibition production staff working together. Individual objects underwent conservation processing, which included high-resolution object photography and gentle vacuuming. Old mounts were removed whenever possible. Once processing was completed, the items were turned over to the collections team for fabrication of custom, archival housings and storage in the state-of-the-art, climate-controlled Collections Resource Center.

At times the team consulted the Museum's Native American Advisory Committee and other Native American community collaborators about proper handling, care, and stewardship of ceremonial and culturally sensitive objects. They continue to guide the conservation and collections teams on important issues within the exhibition, as well as ongoing collections procedures and practices.

Deinstalling the Native North America Hall gave the Museum the opportunity to engage and educate the public about the important work of conservators and collections managers. A temporary 2,800-square-foot work space with three viewing windows in the current Native North America Hall allowed visitors to observe the team at work. During Native American Heritage month in November, the partially emptied exhibition gallery allowed for a special, powerful occasion. Performances of dance, song, and drumming activated the space for ancestral presences in the hall.

The teams now embark on the next exciting phase: preparing objects for the new exhibition.

On your next visit to the Museum, watch a dedicated team of conservators in action at the Regenstein Conservation Laboratory inside *Traveling the Pacific*.

MÁXIMO
THE TITANOSAUR
THE WORLD'S BIGGEST DINOSAUR
FIELD MUSEUM

LUCY HEWETT

NATURAL HISTORY MUSEUMS CAN HELP PREVENT THE NEXT PANDEMIC

COVID-19 made its way to humans from animals, although exactly how is still a topic of scientific debate. Diseases like malaria, West Nile virus, swine flu, and bird flu all got their start in animals too. As people encroach upon the natural world, crossovers like these are becoming more common.

To better understand such diseases and find ways to prevent future pandemics, museum scientists argue the answers lie in developing a better understanding of the animals that help spread them. And, the preserved animal specimens in collections at natural history museums around the world are key to this research over time.

> **“We now have tools to study materials in museum collections in ways never before possible, putting us in an ideal position to get ahead of things like viruses and other disease-causing agents.”**

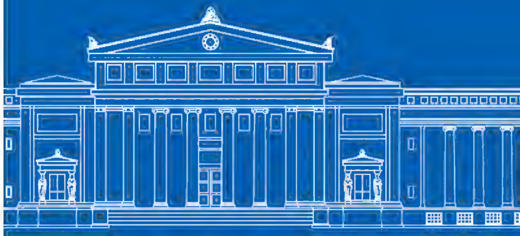
“Museums are incredible repositories of biodiversity information,” said John Bates, PhD, Curator of Birds in the Negaunee Integrative Research Center. Bates is co-author of two editorials in an issue of the journal *BioScience*. “We now have tools to study materials in museum collections in ways never before possible, putting us in an ideal position to get ahead of things like viruses and other disease-causing agents.”

Earlier this year, two Field Museum scholars—Bruce Patterson, PhD, MacArthur Curator of Mammals and Steve Goodman, PhD, MacArthur Field Biologist—published long-term studies on bats which included the discovery of four new bat species by Patterson’s team.

Their work illustrates how coronaviruses and bats have evolved together for millions of years, and how habitat destruction causes disease spillovers from animals to humans.

These findings—rooted in Field Museum collections and scholarship—will inform decisions that address future public health crises. Equally important, this research can influence human behaviors that exacerbate these issues.

(Learn more about this research on page 5).



Help propel the *FIELD FORWARD*

In this moment of global crisis, our work is urgent and relevant. With an unprecedented closure that lasted 126 days, your Museum faces a staggering financial deficit.

With support from several trustees and donors, we launched *Field Forward*—an urgent fundraising challenge to raise $250,000.

Now through September 30, all gifts—including your membership renewal—will be matched dollar-for-dollar, doubling the impact of your contribution. At this critical juncture, your gift will be make all the difference.

Your support propels the Field Forward. Thank you!

To make a gift please call 312.665.7700 or go online at fieldmuseum.org/2020fieldforward.

FIELD MUSEUM LAUNCHES POLLINATORS PROGRAM

BY THORSTEN LUMBSCH, PHD, VICE PRESIDENT OF SCIENCE AND EDUCATION

Pollinators are among the most important species on Earth. Without bees, butterflies, moths, bats, and hummingbirds, most flowering plants would not be able to effectively reproduce. In many cases, plants and their pollinators have evolved together creating unique, symbiotic relationships.

The past decade has seen a mysterious and alarming reduction in pollinator populations worldwide. The most commonly reported instance is "colony collapse disorder" when worker bees abandon their queen and a hive fails. However, this is not the only issue affecting the long-term health of bees and other pollinators.

Scientists are not quite sure what's driving the loss of pollinators, but the impact is dire. Put simply, declining pollinator populations threaten the food security of billions of people.

The Field Museum is establishing a new program to look at this issue. Its goal is to apply modern evolutionary biology theories to solving the root causes of colony collapse and other pollinator issues. A new Curator of Insects will lead a team focused on population dynamics—or models of how a species interacts with its environment and how these interactions affect its population.

This work complements the Museum's recent investments in genomics and bioinformatics while making new use of the collections. The program also has broad, long-term implications for agriculture, human health, and conservation.

The pollinators program is underwritten by The Negaunee Foundation, a long-term supporter of science at the Field. In recognition of the Foundation's extraordinary support, the Field named its research division the Negaunee Integrative Research Center in December 2019. "The Negaunee Foundation is a quiet giant," said President and CEO Richard Lariviere, PhD. "They have funded core research programs for many years, pushing the Field to new levels of achievement. We are honored to recognize their contribution through the Negaunee Integrative Research Center."

(Above) When bees land on flowers and other plants, the tiny hairs on their bodies collect nectar and pollen. Some of it is relocated to pollen sacs on the back legs of the insect to take back to their hives, but a lot of it is transfered between flowers, allowing the plants to reproduce. From apples to coffee, bees are responsible for pollinating most of the fruits, vegetables, seeds, nuts, and grains essential to our diets.

MIGRATORY BIRDS ARE SHRINKING

BY JOHN BATES, PHD, CURATOR OF BIRDS,
NEGAUNEE INTEGRATIVE RESEARCH CENTER

Museum collections are assembled to address all sorts of questions related to the diverse species inhabiting Earth. Just as in medical research, the large sample sizes in natural history collections provide stronger statistical support for assessing patterns and trends. A recent collaborative publication by the Field Museum's birds collection staff with colleagues from the University of Michigan analyzed data from a unique collection. For more than 40 years, Collection Manager Emeritus David Willard, along with volunteers from the Chicago Bird Collision Monitors, salvaged and measured more than 70,000 birds that collided with the windows of tall buildings during migration periods. They uncovered remarkable trends in body size of birds migrating through the Chicago region across this time period. More than 52 species of birds are shrinking—and it's likely due to climate change.

"When we began collecting the data analyzed in this study, we were addressing a few simple questions about year-to-year and season-to-season variation in birds. The phrase 'climate change' as a modern phenomenon was barely on the horizon. The results of this study highlight how long-term datasets are essential for identifying and analyzing trends caused by changes in our environment," said Willard.

Most of these species are getting smaller in body size across this period while their wings are getting slightly longer. This pattern of change in body size is consistent with what is predicted from warming continental temperatures, and provides strong evidence for response to changing climate in multiple species across four decades. The patterns are dramatic and convincing because the sample sizes are so strong.

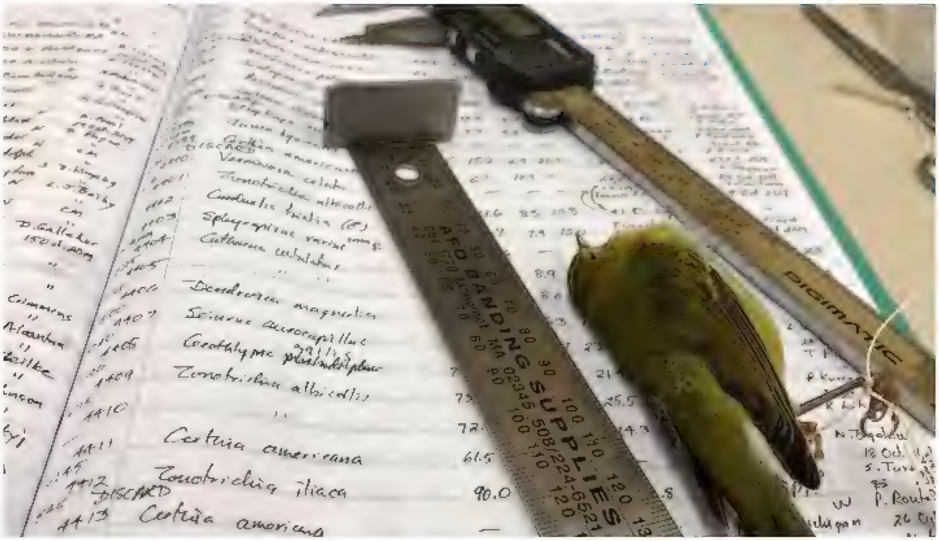
But this is just the first phase of the research, and access to such a data-rich, specimen-based sample size spanning decades will offer researchers the opportunity to address many other questions about these and other specimens in the future. Such modern collections and their associated databases are critical for a better understanding of change through time, and they take dedicated staff and researchers to assemble, curate, and study.

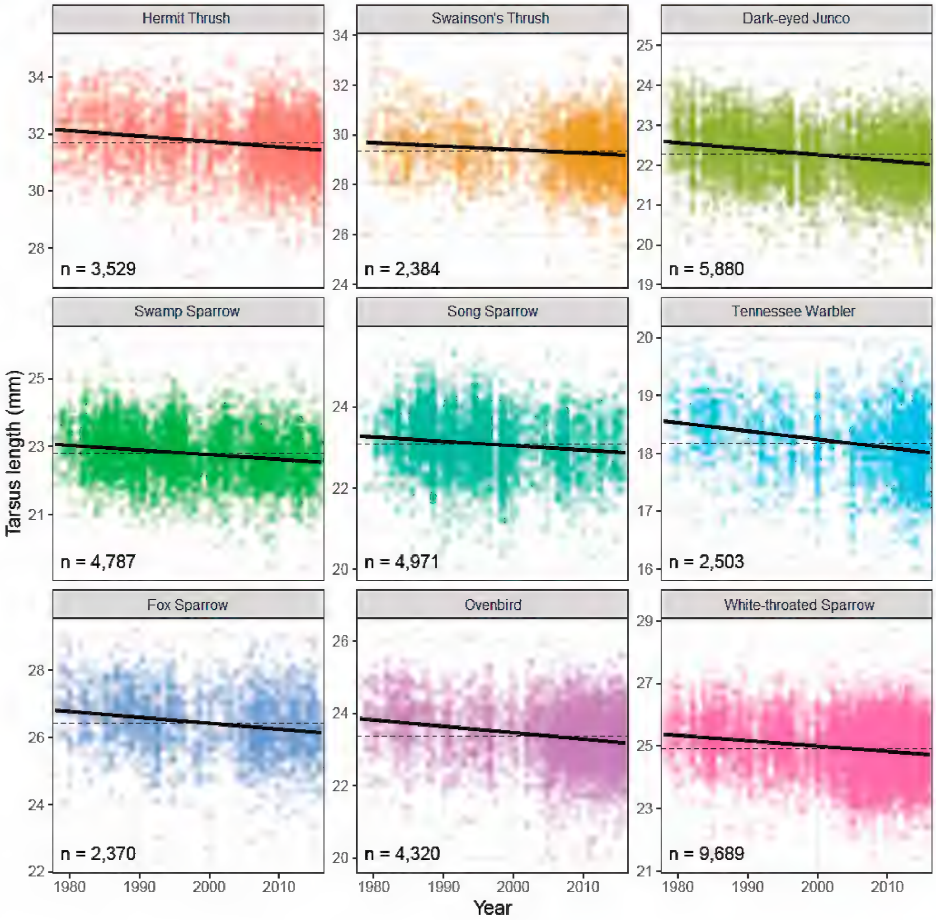
KATE GOLEMBIEWSKI

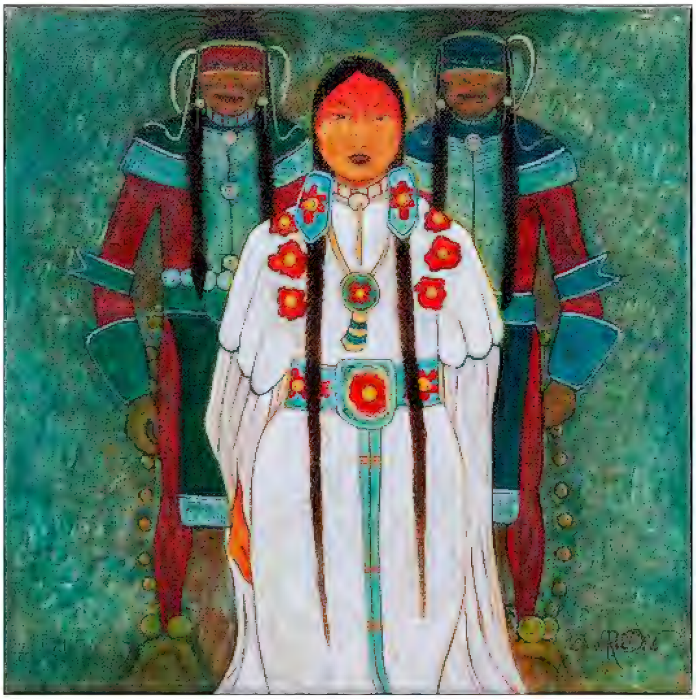
ECOLOGY LETTERS DOI: 10.1111/ELE.13434

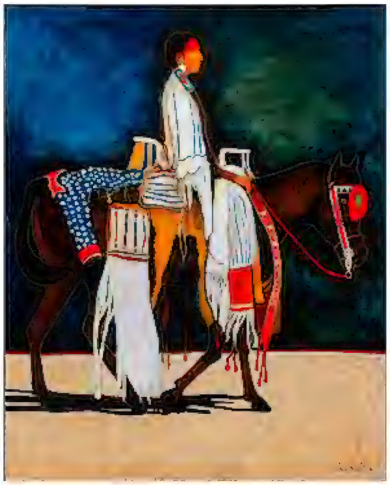
(Below) One amazing aspect of this study is that every specimen has been logged in and measured by one person, David Willard. This controls for measurement variation by different researchers.

(Bottom) Tarsus length (the group of small bones in the hind legs) has long been known to correlate with overall body size. In this graph, changes in tarsus length (y-axis) are tracked across specimens for nine of the most common migrants in the 40-year collection.





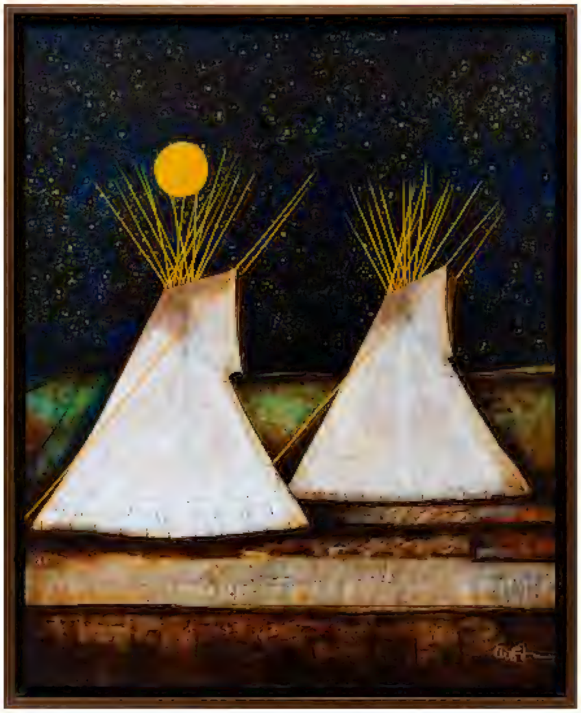




(Far left) Mountain Crow Flower Dress

(Left) Proud Crow Warrior and Provider

(Below) Evening Lodges



KEVIN RED STAR
ROBERT CHASE HEISHMAN

CELEBRATING APSÁALOOKE ARTISTS

BY NINA SANDERS,
GUEST CURATOR, APSÁALOOKE NATION

Apsáalooke Women and Warriors features the contemporary work of several Apsáalooke (also known as Crow) artists, like acclaimed painter Kevin Red Star. A prominent figure in the Contemporary Native Art Movement, Red Star's paintings are just about every Apsáalooke child's first experience with fine art. So, when Red Star came to the Field Museum in April 2019 as part of a delegation of Apsáalooke artists and scholars, we all stood in awe of him.

In spending time with Red Star, you find his personal depth is attributed to his origins. "I have to always remember where I came from—this reservation, this land. That's what has always brought me back to earth," said Red Star. This sentiment speaks to Kevin's enduring subject matter: the Apsáalooke people and the land they come from. Red Star's paintings are masterfully founded in Apsáalooke culture and place, delivering cultural principles and concise historical lessons.

In a time when ideologies of fine Western art are expected to deviate from collective views and into individual expression, Red Star's paintings are an examination and exploration of Apsáalooke culture. "I'm trying to capture an era… I listen to the legends of the days when the tribe followed the buffalo, stories of my family, what happened in this canyon or on that mountain."

In addition to his reverential approaches to painting cultural content, Red Star is deeply concerned with Apsáalooke youth. "What I've been trying to convey, in particular to Apsáalooke youth interested in the arts, is the need to go beyond the borders teachers and society have set—to take chances. A new century is here. I have taken some chances in my career; that's what makes me a little different, I think. I ventured out, not really knowing exactly what I was seeking," said Red Star in an interview with Daniel Gibson, the writer and editor of Kevin's art biography titled, "Kevin Red Star, Crow Indian Artist."

This is the same advice he gave us, the group of Apsáalooke artists and scholars who entered the Field Museum alongside him on that chilly April day. We are proud to usher in a new century of art and understanding with Red Star. He has led the way, and we continue to follow with great respect.

SEE THESE FANTASTIC PAINTINGS BY KEVIN RED STAR AND MANY OTHER ARTWORKS FROM CONTEMPORARY APSÁALOOKE ARTISTS IN *APSÁALOOKE WOMEN AND WARRIORS*, OPEN NOW.

This exhibition is jointly organized by the Field Museum and the Neubauer Collegium for Culture and Society at the University of Chicago.

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(Left, top) Learning to Fish. *Fishing with poisonous barbasco vines is a technique the Ese'Eja learn from their elders. Thick woody vines are pulverized and then shaken in the water to disperse the poison. After a few minutes the fish begin to float to the surface.*

(Left, bottom) Mateo. *Ese'Eja elder Mateo Viaeja said, "We are the ancient owners of this land because we were the first to descend from the sky on a thread of cotton. Without the forest, there is no life... and no Ese'Eja."*

THE ESE'EJA PEOPLE OF THE AMAZON

BY RACHEL HILL, EXHIBITIONS

The Ese'Eja People of the Amazon combines cultural objects and unique photography to highlight the rich culture of the Ese'Eja people of Peru and the daily challenges they face. Like many other indigenous peoples in the Amazon, the Ese'Eja people are losing their homelands to external pressures such as invasive mining and pollution.

In the exhibition, visitors will encounter a series of daguerreotypes—an early method of photography that develops images on silver plates using mercury. The photographers used the same methods as original daguerreotypes to bring attention to mercury dumped into the Amazon River as a byproduct of illegal gold mining. Because of the gold-gilded silver plating, daguerreotype images have long been described as "mirrors with memory." As the viewer approaches these portraits, they will first see themselves in the reflective silver surface but, as they look closer, Ese'Eja community members will become visible.

Visitors will also see platinum-palladium photographs of life in the Ese'Eja community. Printed on Japanese Kozo paper, these images reflect outside influences on the Ese'Eja people.

The exhibition also includes a variety of cultural objects, ranging from household objects and tools to jewelry. Many objects are made entirely out of local plants and animals, but others mix both natural and industrial materials—for example, some baskets are made with plastic and natural fibers.

While the Ese'Eja face many challenges, they are resilient. Their villages are developing community and eco-tourism, drawing on their unique knowledge and relationship to the land. Elders and youth produce artisan crafts to train younger generations in their traditional ways and as a source of sustainable livelihood. This exhibition is a product of their stories, technologies, and expertise. It offers a unique perspective on the complex political, environmental, and social issues of contemporary Peru.

THE ESE'EJA PEOPLE OF THE AMAZON: CONNECTED BY A THREAD IS COMING SOON TO THE GARY C. COMER FAMILY GALLERY. PLEASE CHECK FIELDMUSEUM.ORG/EXHIBITIONS FOR UPDATES ON ALL FIELD MUSEUM EXHIBITIONS.

THIS EXHIBITION HAS BEEN DEVELOPED THROUGH A COLLABORATION WITH THE UNIVERSITY OF DELAWARE AND DICKINSON COLLEGE IN PARTNERSHIP WITH THE ESE'EJA NATION.

KYLE FLUBACKER PHOTOGRAPHY

Farewell Richard and Jan!

After eight years as President and CEO of the Field Museum, Richard W. Lariviere, PhD, will retire in August 2020.

In The Field: When you came to the Museum in 2012, you had a vision to anchor the Museum in its mission and remind Chicago and the world why our work matters. Eight years later, how has the Museum accomplished this?

Richard W. Lariviere: The Field Museum community has clarified the mission and focus of the museum. Our scientific power and impact came to inform all that we do.

ITF: How has the Museum grown in your time as president?

RWL: An institution like the Field changes constantly. There is, I think, a greater awareness of this than ever within the museum. This has resulted in an understanding of the need for communication and collaboration across units. We have broken down some silos, poked holes in other silos, and repeatedly called for a collaborative effort in fulfilling our mission.

ITF: What surprised you most when you took on your new role?

RWL: What surprised me most were the financial challenges facing the museum. It was, well, an "interesting" period as our situation became clearer. What was wonderful at that moment was the response of the Field Museum community—the Board, the Museum members, and the staff. They rallied in a sustained way and helped the institution get to a position of genuine security. A position that is enabling us to weather the current scourge with optimism for the future.

ITF: What got you through the challenging times?

RWL: What gets me through any challenging time is the love and honest support of family and friends. People who can and will tell you the truth as they see it. I am lucky to have a family that is in the habit of affectionate candor. But I am also lucky to have had Board leaders and members who have been unfailingly helpful in providing advice and counsel. I think they know who they are, and I hope they know how deeply grateful I am to them.

ITF: What is your personal philosophy on philanthropy?

RWL: A friend of mine recently shared with me the notion that the only thing that you have—that no one can ever take from you—is what you have given to others. This puzzled me at first, but it is right. The multiplier of supporting a mission-driven institution like the Field is especially strong. When the Museum comes out of this stressful time and continues its scientific work, its environmental advocacy, and its educational impact, ALL of that work will be possible because of the support of the philanthropic community. The gifts of previous generations have secured what we have done. The gifts of this generation will secure what we WILL do.

ITF: If there is one piece of advice you would give to our new president, what would it be?

RWL: Enjoy! This museum, this community is a rare and precious constellation of science and humanity to be treasured.

KYLE FLUBACKER PHOTOGRAPHY

[illegible]116BD / JOHN WEINSTEIN

> "When the Museum comes out of this stressful time and continues its scientific work, its environmental advocacy, and its educational impact, ALL of that work will be possible because of the support of the philanthropic community."

RYAN WILLIAMS

THE POLITICS OF BEER

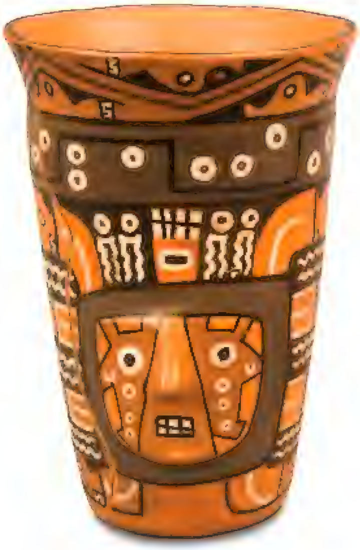
BY RYAN WILLIAMS, PHD, ASSOCIATE CURATOR AND HEAD OF ANTHROPOLOGY

At the Field Museum, our research aims to answer big questions about nature and culture to enable solutions for our future. My colleagues and I authored a recent study in *Sustainability* that shows the relationship between shared ideals and stable societies, and how those ideals are formed and strengthened. Using discoveries and materials excavated at an ancient brewery from the Wari empire of Peru (600-1100 CE), this study reveals how sustainable governance requires a shared set of values among political elites that allow them to explore their collaborative potential. In the ancient Wari empire and many other societies, including our own, these kinds of shared values are built on ritual acts—like beer festivals.

Political agreements were formed in the Wari empire during elite festivals involving the consumption of *chicha de molle*—an alcoholic beverage made from the Peruvian pepper berry. Served in ceramic vessels that depicted supernatural beings and communicated elite allegiances, *chicha* consumed during ritual drinking sessions helped develop political alliances between the one to two hundred community leaders who attended these festivals and affirmed Wari ideology.

In addition, the festivals used renewable local resources, preventing disruption to trade routes, political bickering, and interference from external adversaries. Through elemental analysis we were able to determine that the clay used to make the vessels came from nearby locations. We also discovered that the agricultural landscapes created by the Wari promoted the growth of pepper berry trees used to brew chicha. These components made the events uniquely Wari. And it was only in these special circumstances that political allegiances sanctioned by shared customs could be formed.

This study begins to reveal why the Wari empire successfully ruled most of Peru for 500 years and illustrates not only the importance of local self-sufficiency, but also the role of identity and cultural practices in binding members of society together. Its implications are highly relevant to today as it helps us understand how institutions unite people from diverse constituencies and backgrounds. Without them, large political entities often begin to fragment and break into smaller groups, threatening the stability of a society.



(Top) Excavations underway at the Wari brewery at Cerro Baul.

(Above) A replica of a drinking vessel from the Cerro Baul brewery now on the Field Museum's collections. (Catalog Number 359529).

BLUE

BY LAUREN WAGNER, LEARNING CENTER AND **ANNA VILLANYI,** LEARNING CENTER

How does the color blue make you feel? Where do you see blue in nature and why is it so hard to find?

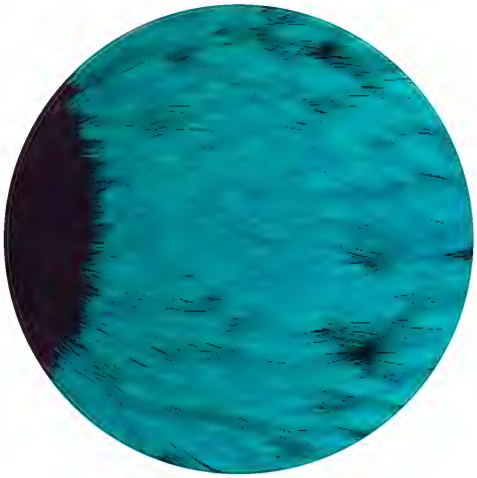
Blue opened in the *Grainger Science Hub* in February 2020 and offers guests of all ages a chance to learn more about the wonder that is the color blue. This small exhibition features specimens and artifacts from the Field Museum's behind-the-scenes research collections.

Blue is rare in nature. While we observe it on a variety of animals like reptiles, this kind of blue is almost always an optical illusion. Rather than a pigment, the blue you see in feathers, fish scales, and butterfly wings is a structural color. Structural colors are created when light bounces off microscopic structures on the surfaces of different animals at a particular angle, creating the illusion of the color we see and identify as blue. This is caused by the disruption of the wavelengths that cause us to see different hues. Visit the *Grainger Science Hub* this summer to get up-close and personal with dazzling blue-feathered birds like the Kotinga, Indigo Bunting, and a variety of blue butterflies and insects. Examine specimens and use different light sources to discover these animals aren't really blue, but completely different colors.

In addition to the animals on display, visitors to *Blue* will see objects from the Museum's Anthropology collection that utilize this brilliant color. Because blue pigment is so rare in nature, people have innovated ways to make it for themselves. The Maya people of Mexico, Guatemala, and Belize created the famous "Maya Blue" pigment by heating a specific clay with the leaves of the indigo plant.

Educators in the *Grainger Science Hub* will help you explore how structural blue works, how blue pigments are made, and what blue means for people and animals all over the planet.

Blue is rare in nature. While we observe it on a variety of animals, blue on birds, reptiles, and insects is almost always an optical illusion.



(From top)
*The wings of the Blue Morpho butterfly (*Morpho menelaus*) are iridescent blue due to structural coloration rather than pigment.*

A ceramic grater bowl from Chichen Itza, Mexico that shows Maya Blue pigment on its surface. (Catalog Number 48158)

The vibrant turquoise plumage of a male spangled cotinga (Cotinga cayana).

Z94506_07AD / JOHN WEINSTEIN
FIELD MUSEUM
ANNA VILLANYI

> At a broad geographic scale, new studies of Neotropical plants and animals document that different regions of South America are both interconnected and evolving independently over time.

PIECING TOGETHER THE ANCIENT AMAZON

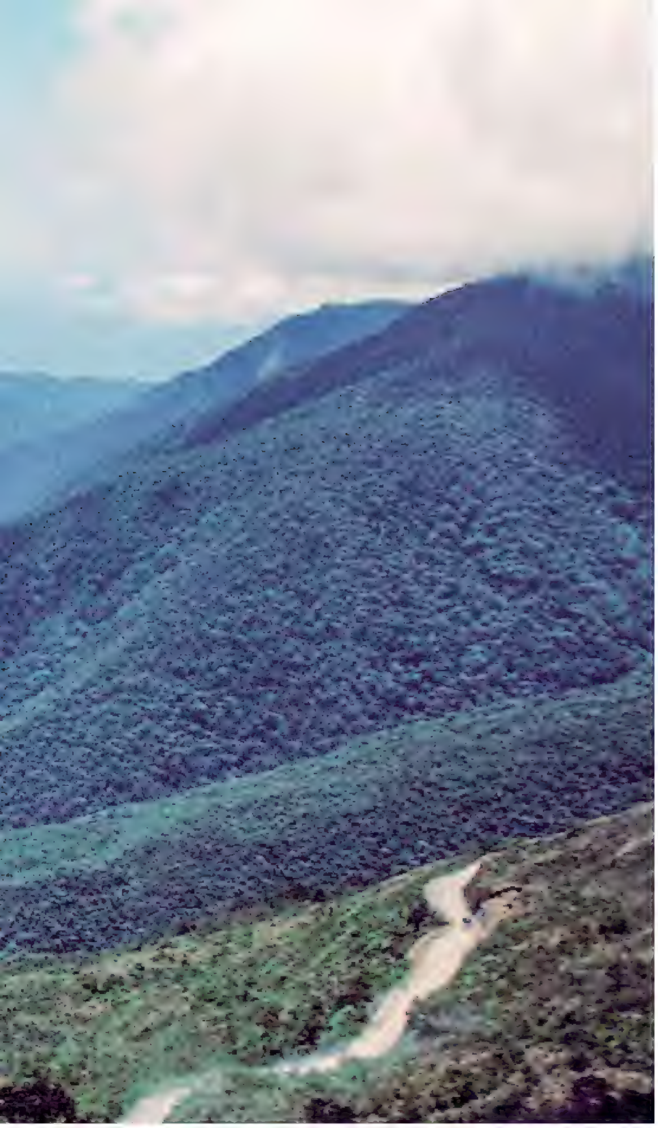
By John Bates, PhD
CURATOR OF BIRDS,
NEGAUNEE INTEGRATIVE RESEARCH CENTER

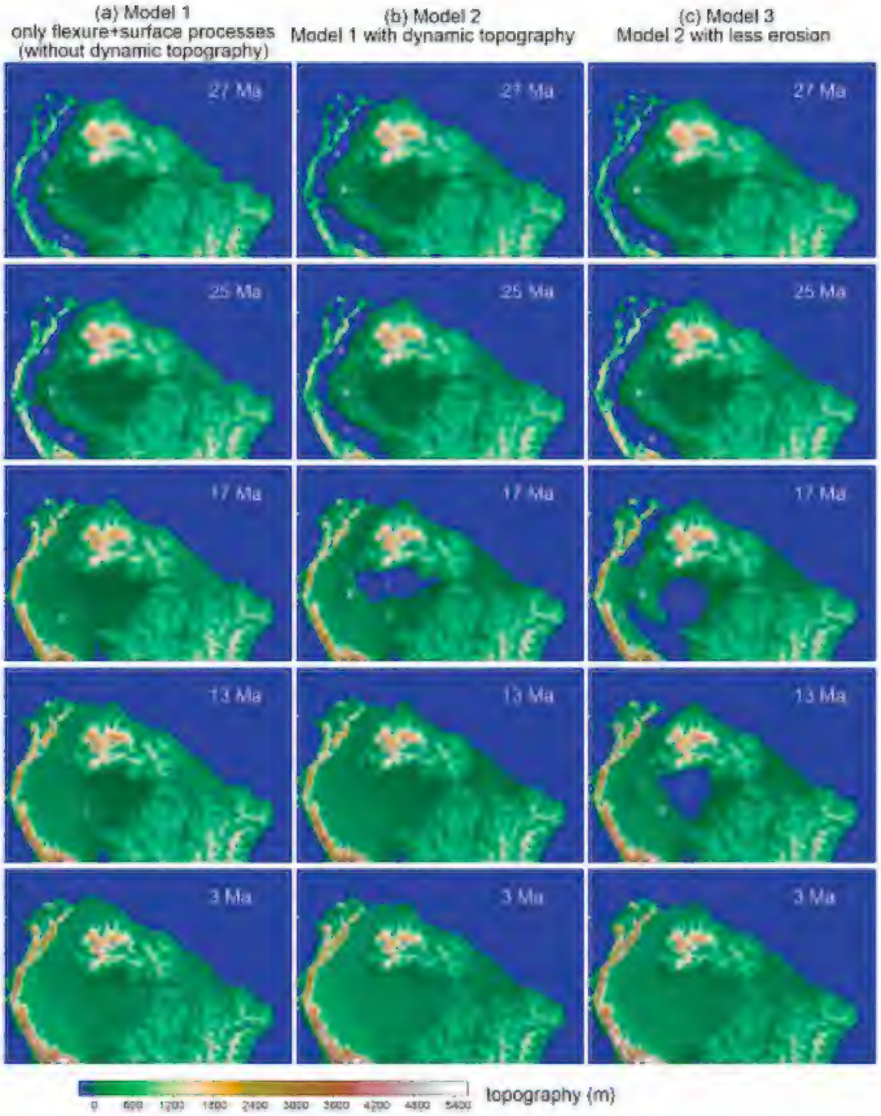
A longstanding goal of Field Museum research is to study patterns of biodiversity across space and time to understand the processes that gave rise to them. This broad picture informs us about the status of biodiversity and the issues it faces in our world today. Increasingly becoming a collaborative and international scientific effort, we now have more types of data, better collections, and new analytical techniques available to us. With these tools in hand, Field Museum curators and environmental scientists are making breakthroughs in understanding rich and dynamic ecosystems like the Neotropics.

At a broad geographic scale, new studies of Neotropical plants and animals document that different regions of South America are both interconnected and evolving independently over time. And, as we study this region, we're beginning to understand the key role the landscape's history has played in this.

A 2019 paper published in *Nature: Scientific Reports*—which developed from a collaborative grant from the National Science Foundation, the Brazilian Science Agency, The São Paulo Research Foundation, and NASA—presents new models of the geographic history of northern South America from the perspective of the Andean uplift that began 30 million years ago. The model demonstrates how the resulting sediment flow from the Andes forced landscape change across the Amazon Basin, eventually creating the modern river system we see today. It also highlights how this led to constant and dramatic impacts on the basin throughout time. My colleague Camila Ribas (Instituto Nacional de Pesquisas da Amazônia) and I used recently published results from our research on the evolution of Amazonian birds to highlight how broad patterns across many species are consistent with these geologic models.

But, this work isn't limited to birds. Last year, MacArthur Curator of Mammals Bruce Patterson published several related articles with former students from Brazil and Peru revising the description of long-ear armadillos, describing a new species of Amazonian fruit bat, and tracing the eight-million-year diversification of South America's sigmodontinae rodents.




(a) Model 1
only flexure+surface processes
(without dynamic topography)
(b) Model 2
Model 1 with dynamic topography
(c) Model 3
Model 2 with less erosion
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NATURE SCIENTIFIC REPORTS

But, even after all this, we still know far too little about the biodiversity of this incredible region. This is why ongoing fieldwork and research targeting specific aspects of Neotropical biodiversity continue to be a priority for the Museum. Through our many collaborations, we advise graduate students from Latin America to build stronger, more diverse scientific communities that are increasingly connected across geography. Based on Museum collections and field work, these ongoing collaborations and trainings are generating new knowledge about poorly studied groups of animals.

(Above, left) The Amazon Basin reaches its western limits along the Andean Mountain chain. This is one of the most species-rich landscapes in the world and a long-term focus of Field Museum research and conservation efforts.

(Above, right) Landscape evolution in the Amazon based on new models of uplift and sediment flow out of the Andes. The panels in this graphic cover time slices over a 27-million-year period of dramatic change.

(Right) The Amazon is home to 15% of all the bird species in the world, including this White-chinned Sapphure (Hylocharis cyanus)*.*

JOHN BATES

SCIENTISTS FIGHT RABIES IN KENYA

BY ADAM FERGUSON, PHD,
NEGAUNEE COLLECTIONS MANAGER,
GANTZ FAMILY COLLECTIONS CENTER

Rabies is scary. This deadly, yet completely preventable disease, has been haunting humanity for over 1,500 years. It's even thought to be one origin for the myths of vampires and werewolves. Ironically, it's neither bats nor wolves that can be blamed for human rabies. Instead, blame lays with a mammal we actually invited into our home: domestic dogs.

Of the 59,000 human deaths attributed to rabies every year, more than 99 percent of these result from domestic dog bites. The majority of deaths occur in children living in rural communities, especially on continental Africa—where an estimated 21,500 people die of the disease every year. But, the fact that domestic dogs serve as the major carriers of this deadly virus gives us an advantage in our efforts to eradicate the disease through mass vaccination campaigns.

My colleagues, Dedan Ngatia (Karatina University) and Dishon Muloi (International Livestock Research Institute and University of Edinburgh), and I helped establish The Laikipia Rabies Vaccination Campaign (LRVC) in central Kenya to eliminate rabies from rural communities. Since its inception in 2015, the LRVC has vaccinated more than 25,000 domestic dogs at no cost to their owners—protecting the people, domestic animals, and endangered wildlife that share this landscape.

In 2019, supported by Veterinarians International, our latest campaign efforts were aided by an app developed by Mission Rabies, a UK non-profit organization. This app allowed us to manage vaccination data in real time, guiding our on-the-ground efforts to obtain homogeneous vaccination coverage across the Laikipia landscape. Our teams of veterinarians, volunteers, and researchers worked with dog owners to corral and convince these semi-wild animals that getting a shot and paint mark—used to track which dogs have been vaccinated—is no big deal. As a Texan, I have dubbed this part of the LRVC the "dog rodeo." We gathered several hundred dogs at one site and vaccinated them in under 15 minutes!

The LRVC was founded in grassroots activism with support from Mpala Research Centre, the County Government of Laikipia, and the National Government of Kenya through the Zoonotic Disease Unit. Successfully eliminating rabies from Laikipia County will require obtaining vaccination coverage of more than 70% of the domestic dog population—currently estimated to be around 35,000 animals—for more than three years, a daunting but achievable goal that the LRVC is well on the path to achieving. Read more about the science behind the LRVC and see the team's recently published paper "Volunteer based approach to dog vaccination campaigns to eliminate human rabies: Lessons from Laikipia County, Kenya" in *PLoS Neglected Tropical Diseases*.

(Above) Co-founder of the Laikipia Rabies Vaccination Campaign and Negaunee Collection Manager of Mammals Adam Ferguson holds a small puppy during the 2019 LRVC in Laikipia County, Kenya.

(Below) The Laikipia Rabies Vaccination Campaign team gathers for a group photo.

ALL IMAGES ADAM FERGUSON

ALL IMAGES PAUL BICK

MULTISPECIES WELLNESS IN A GLOBAL CITY

BY ALAKA WALI, PHD, CURATOR OF NORTH AMERICAN ANTHROPOLOGY, AND **MOLLY DOANE, PHD**, ADJUNCT CURATOR, NEGAUNEE INTEGRATIVE RESEARCH CENTER

The Museum will open a special exhibition to tell the stories of Chicago's diverse communities' efforts to maintain physical and social well-being. Part of an ongoing multidisciplinary research initiative of anthropologists, ethnobotanists, community garden partners, and artists led by co-PI's Molly Doane, Alaka Wali, and Johanne Michael (University of Illinois at Chicago), *Plant Medicine* will explore the connections between nature, health, and growing roots in Chicago.

The exhibition tells the story of newly arrived refugees on the Northside who bring their practical knowledge, plants, and aesthetic dispositions to gardens. It's there that they create familiar smells, textures and ways of interacting as communities. They work through traumas of displacement, pass on traditional knowledge to children born in exile and sell their produce at farmers' markets.

On the near West Side, Latino gardeners plant prairie flowers on a remediated brownsite—previously developed land where hazardous pollutants may be present. They tend to monarch butterfly chrysalis in order to maximize the chances of emergence and trans-migration to Mexico.

On the South Side, a neighborhood heavily affected by redlining, out-migration, and school closures, hopes to remake itself as the city's food garden, and a growing network of gardeners and farmers hopes to become economically viable producers.

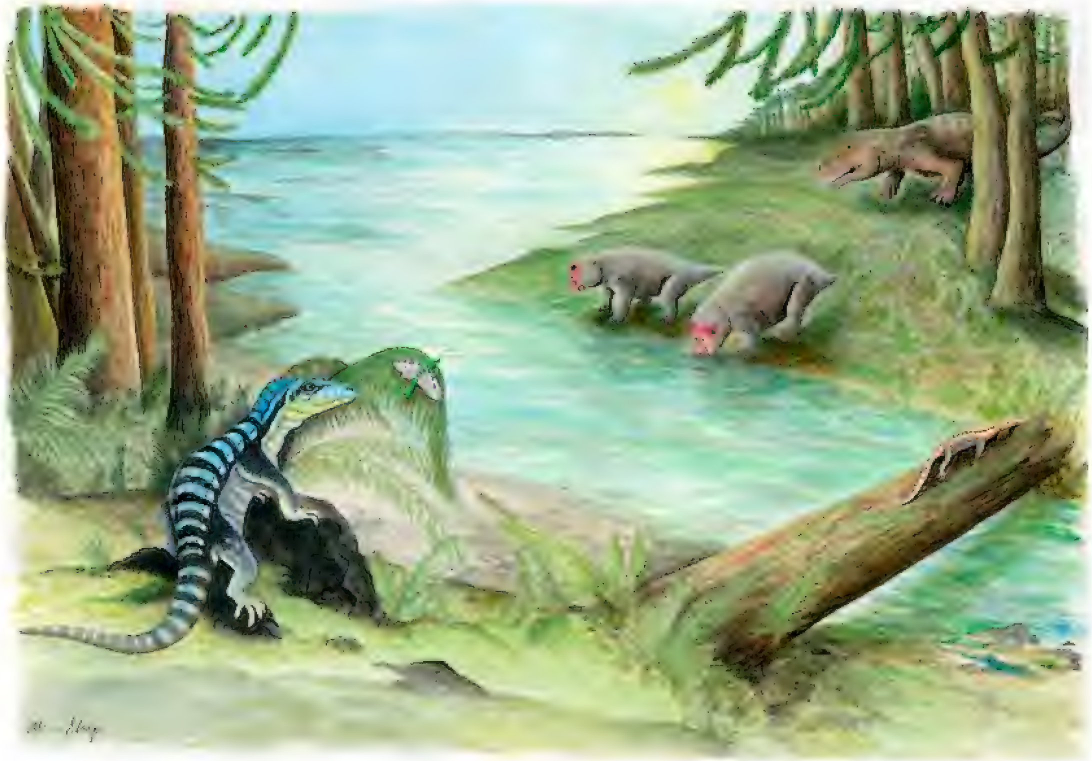
In ethnic pharmacies around the city, plant-based medicines connect Chicagoans to alternative ways of thinking about health and disease. Throughout the city, people otherwise dislodged or in flux—because of changing health, ability, neighborhood, or family situation—turn to plants and planting to ground themselves in wellness and community.

Plant Medicine is coming soon to the Daniel F. and Ada L. Rice Gallery. Please check fieldmuseum.org/exhibitions for updates on all Field Museum exhibitions.

THE EXHIBITION IS MADE POSSIBLE IN PART BY THE GENEROUS SUPPORT OF THE DAPHNE HOCH CUNNINGHAM LEAD CHARITABLE TRUST.

(Top) A Congolese gardener at Global Garden Refugee Training Farm in Albany Park.

(Above left) A Burmese gardener at Horner Park Farmers Market.



"The combination of art and science is why I got into museum work. I was drawn to the natural world as a subject matter and was obsessed with dinosaurs."

(Left) "Antarctanax, *King of the Antarctic," created for the Field Museum press release of Brandon Peecook's paper on a new archosaur discovery in Antarctica.*

(Below) Adrienne Stroup sketches a Daspletosaurus on a blackboard.

ADRIENNE STROUP

Artists in Science

ADRIENNE STROUP

BY CONNIE EYER,
INSTITUTIONAL ADVANCEMENT

Recently, education programs across the nation have broadened their focus on STEM (science, technology, engineering, and math) to include the arts, which help develop important skills such as design and creative planning. The Field Museum has a number of staff members, like Geology Collections Assistant Adrienne Stroup, who blend these disciplines to aid scientists in making groundbreaking discoveries.

Although Stroup has a B.A. in Geology and a Master's in Museum Studies, she took private art lessons early in life and worked to fit in art classes whenever she could in her later education. "The combination of art and science is why I got into museum work," she said. "I was drawn to the natural world as a subject matter and was obsessed with dinosaurs."

"The thrill of being the first person to lay eyes on a perfectly preserved fossil never gets old," Stroup noted. "Beyond the Field, it's equally impressive to be a part of a long history of museum scientists carefully collecting fossils to be studied for decades and hopefully centuries into the future."

Prior to coming to the Field, she was an intern for two summers at Ashfall Fossil Beds State Park in Nebraska, where her first arts and science job included the creation of "before and after" illustrations for their Visitors' Center to illustrate animals that perished in a Miocene Era volcanic eruption.

As a collections assistant, Stroup follows up on open and overdue specimen loans, processes and keeps track of current requests, and packages specimens for mailing. "I originally thought I'd get into exhibit work, but found that I liked collections management even more," Stroup said. But she also does beautiful scientific illustrations for scholarly journals and educational programs.

CAITLIN KEARNEY

Her artwork has been featured in recent Field Museum press releases on Rowe Family Curator of Evolutionary Biology Olivier Rieppel's research on a species of early shell-less turtle, as well as a fossil of an iguana-sized dinosaur relative found in temperate Antarctic forests by Brandon Peecook (University of Washington and Field Museum). And her work will soon be featured in Discovery Cart programing, which can be found in Stanley Field Hall daily from 10am to 3pm.

Charitable Gift Annuities at the Field Museum:

RANDOLPH AND LORRAINE BARBA

Randy and Lorraine Barba wanted to ensure that their lifelong love for science could be shared with future generations. Generous and faithful members of the Field Loyalty Club, they recently created a charitable gift annuity with the Field Museum.

Charitable gift annuities at the Field Museum are a great way to help ensure both the stable financial future of the Field Museum and a secure income for the donor.

"It is an easy process, and the staff at the Museum were able to handle all of it through email, mail, and over the phone," Randy shared. "We could be anywhere in the world and still create this gift."

Given their love of global travel, having flexibility was important to them. Since retiring from his partnership at Accenture in 2004, Randy and Lorraine not only travel to interesting places, but visit the Field Museum as frequently as they can.

"We like to come to the Museum and visit the exhibitions about places we're planning to go, to give us information and history before we arrive," Randy said. "I've accomplished a couple things at the same time. I know I'm going to give the money away anyway and I did it as tax-efficiently as possible. Why wouldn't I do that?"

The Founders' Council is the Museum's premier donor circle recognizing donors who make annual gifts of $2,500 or more.

The Field Loyalty Club honors Museum supporters for their 20+ years of generosity.

RANDOLPH AND LORRAINE BARBA

For more information about creating a charitable gift annuity to benefit both you and the Museum, please contact Kyle Daniels, Planned Giving Coordinator, at kdaniels@fieldmuseum.org or 312.665.7869 or visit fieldmuseum.org/plannedgiving

Photographs of Schistochila *(right) and* Pleurozia *(bottom) liverworts from Fiji.*

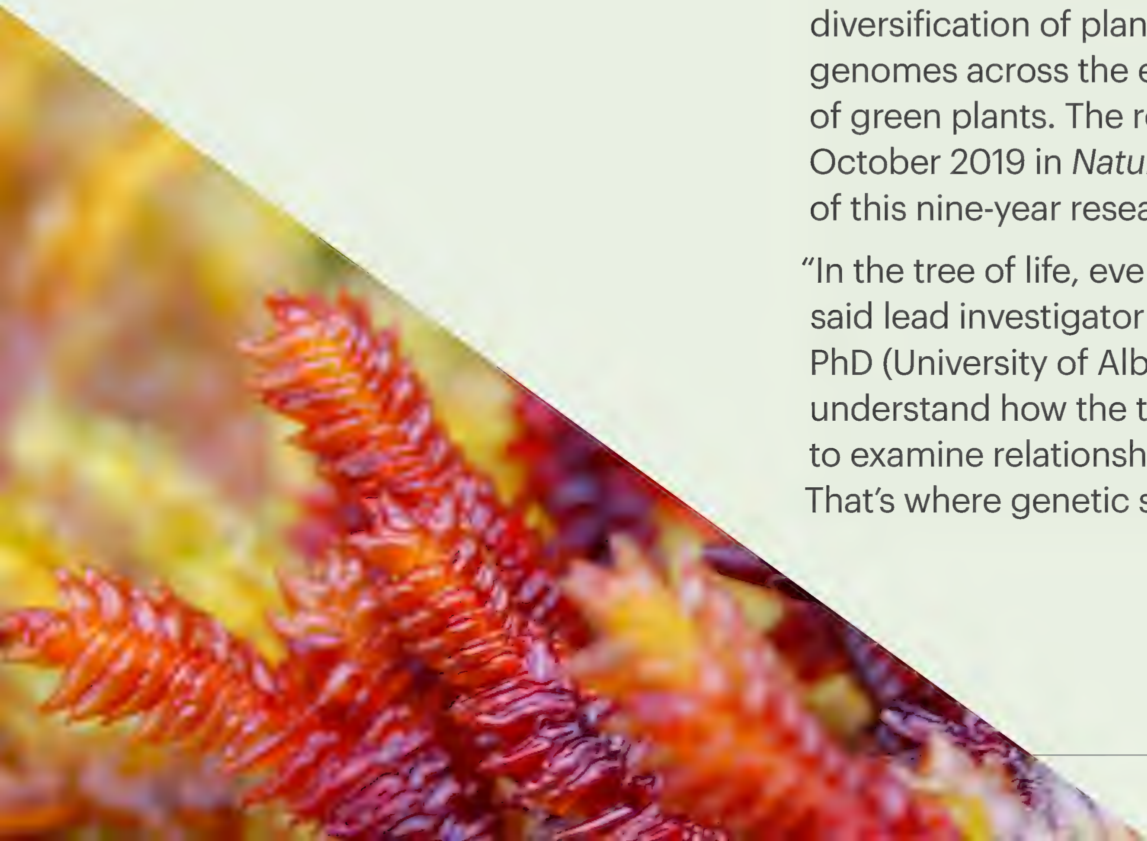
Scientists Unlock an Eon of Plant Evolution

By Matt von Konrat, PhD

MCCARTER COLLECTIONS MANAGER AND HEAD OF BOTANY COLLECTIONS, GANTZ FAMILY COLLECTIONS CENTER

An international association of more than 200 plant scientists has released genetic sequences for more than 1,100 plant species. This breakthrough was part of the One Thousand Plant Transcriptomes Initiative (1KP), a global collaboration to examine the diversification of plant species, genes, and genomes across the entire billion-year history of green plants. The results, published in October 2019 in *Nature*, are the culmination of this nine-year research project.

“In the tree of life, everything is interrelated,” said lead investigator Gane Ka-Shu Wong, PhD (University of Alberta). “If we want to understand how the tree of life works, we need to examine relationships between species. That’s where genetic sequencing comes in.”



JUAN LARRAIN MATT VON KONRAT

McCarter Collections Manager Matt Von Konrat photographs specimens in the field.

I was brought onto the project back in 2012, when the 1KP researchers needed specimens representing the full spectrum of green plants. My specialty, liverworts, were critical to the study because the interrelationships among bryophytes (mosses, liverworts, and hornworts) and other green land plants has long been problematic to study. The team needed large quantities of fresh material for the type of analysis they were pursuing. Typically, fresh material would be collected in the field and immediately frozen in liquid nitrogen, but this was not possible for the team at the time. However, I was also growing Fijian bryophytes right here at the Museum and was able to provide cultivated material of two hyper-diverse liverworts for RNA.

The massive scope of the project demanded development and refinement of new computational tools for sequence assembly and phylogenetic analysis. Computer scientists developed new algorithms for inferring evolutionary relationships from hundreds of gene sequences for more than 1,000 species. By sequencing and analyzing genes from a broad sampling of plant species, researchers were able to reconstruct gene content in the ancestors of all crops and model plant species to gain a more complete picture of the genes that enabled evolutionary change.

The study's findings reveal the timing of the origins, expansions, and contractions of gene families contributing to fundamental genetic innovations enabling the evolution of all green plant lineages. The history of how and when plants developed the ability to grow tall and make seeds, flowers, and fruits provides a framework for understanding plant diversity, including annual crops and forest tree species. Overall, the new picture of evolutionary relationships provided by 1KP has led to new hypotheses about the origins of key structures and processes in green plants.

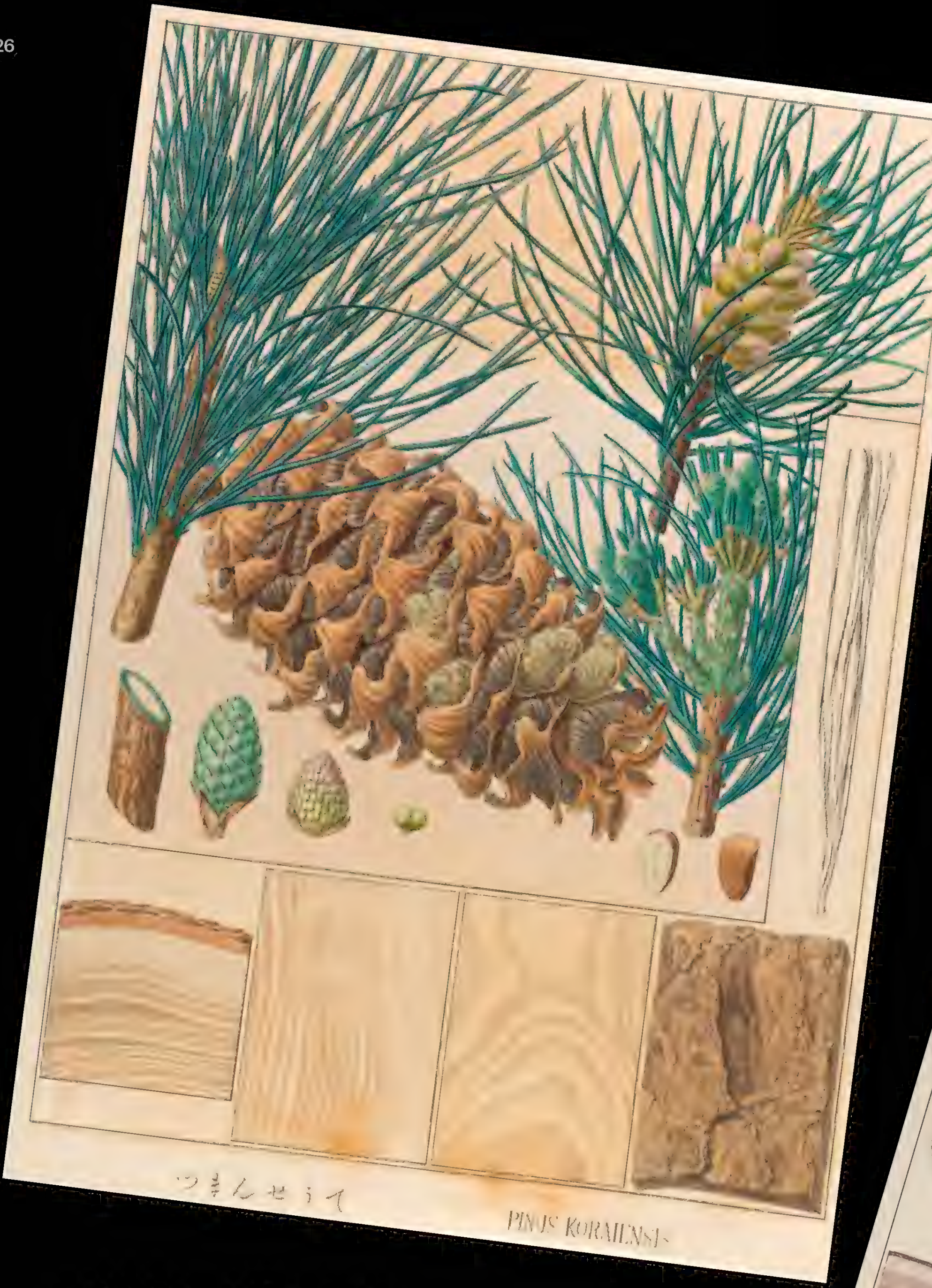
LUCY HEWETT

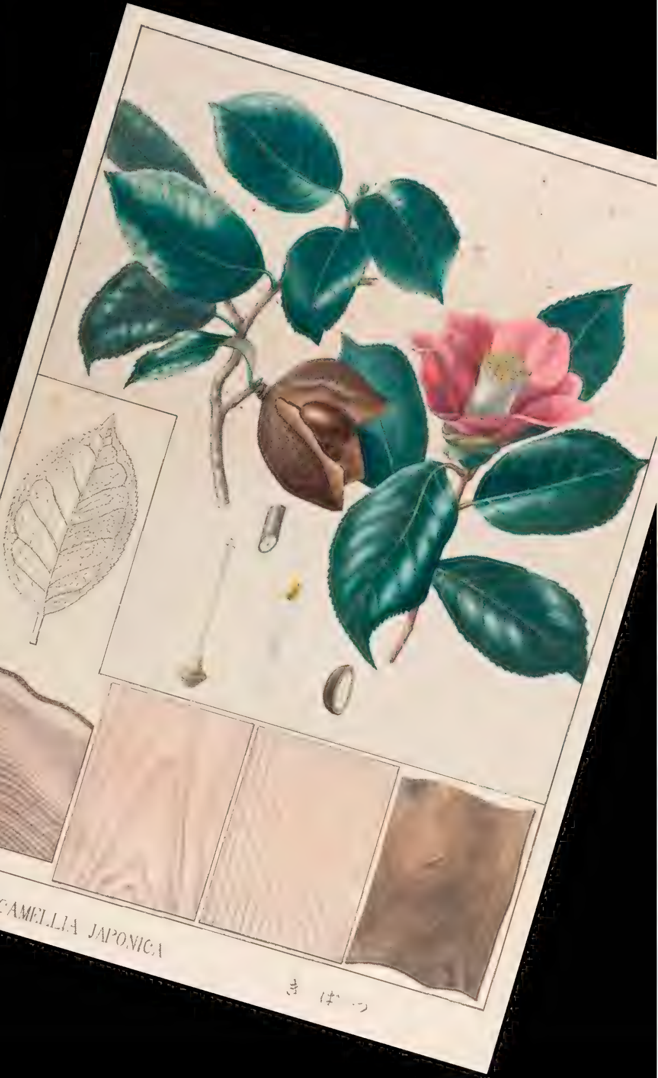
Help Our Scientists Digitize Our Collections!

In 2017, the Field created the Collections Club, a special volunteer opportunity for community scientists to help digitize information from the 40 million artifacts and specimens so scientists in the Museum and around the world can use data from our collections to make new breakthrough discoveries.

Working in all scientific collections in the Museum, participants have generated data from more than 86,000 objects and specimens in the last three years. In January alone, participants re-packeted 1,037 moss specimens, imaged more than 800 bryophyte and lichen labels, precurated flowering plant specimens, and transcribed label data from a recent gift of small mammals from the University of Kentucky. Greatly improving and enhancing the Museum's collections and their associated data, the Collections Club is dedicated to deepening the connection between scientific collections and the general public.

To learn how you can become involved, visit fieldmuseum.org/collectionsclub or email wedigbio@fieldmuseum.org.





Hidden History in Our Collection

While filing specimens from Asia in the John G. Searle Herbarium Collections Manager Christine Niezgoda came across a beautiful watercolor print intermingled with the sheets. Through research in the Botany archives, she discovered that this was part of a collection of lithographs made by the Japanese Commission for the World's Columbian Exposition of 1893, and is among the Field's first acquisitions.

These prints are unique because they represent some of the earliest lithographs from Japan, printed in black and white and then hand painted with watercolors. The lithographs accurately depict the leaf arrangement, flower details, and fruits typical in botanical prints. But, these lithographs go one step further with detailed bark illustrations as well as the cross and longitudinal sections of the tree for a stunning result. To date we have uncovered a total 64 lithographs in the herbarium with eight still missing.

October is Member Appreciation Month!

Your membership makes an impact every day at the Field Museum by supporting the work of our scientists. You support the care of nearly 40 million objects and specimens and ongoing scientific discovery around the world. To celebrate our members, the Field Museum is offering special benefits during the entire month of October. You'll receive invitations to exclusive member-only events, enjoy double discounts in our Museum stores on October 15 and 16, plus other fun perks just for members!

Check your member e-newsletters to get all the details about Member Appreciation Month. Not receiving our e-newsletters? Send us an email at membership@fieldmuseum.org and let us know you want to be added to our e-mail list!

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EXPANDING HORIZONS

We proudly support the Field Museum and applaud its commitment to inspiring students, families, and adults to engage with art, science and culture in creative ways.

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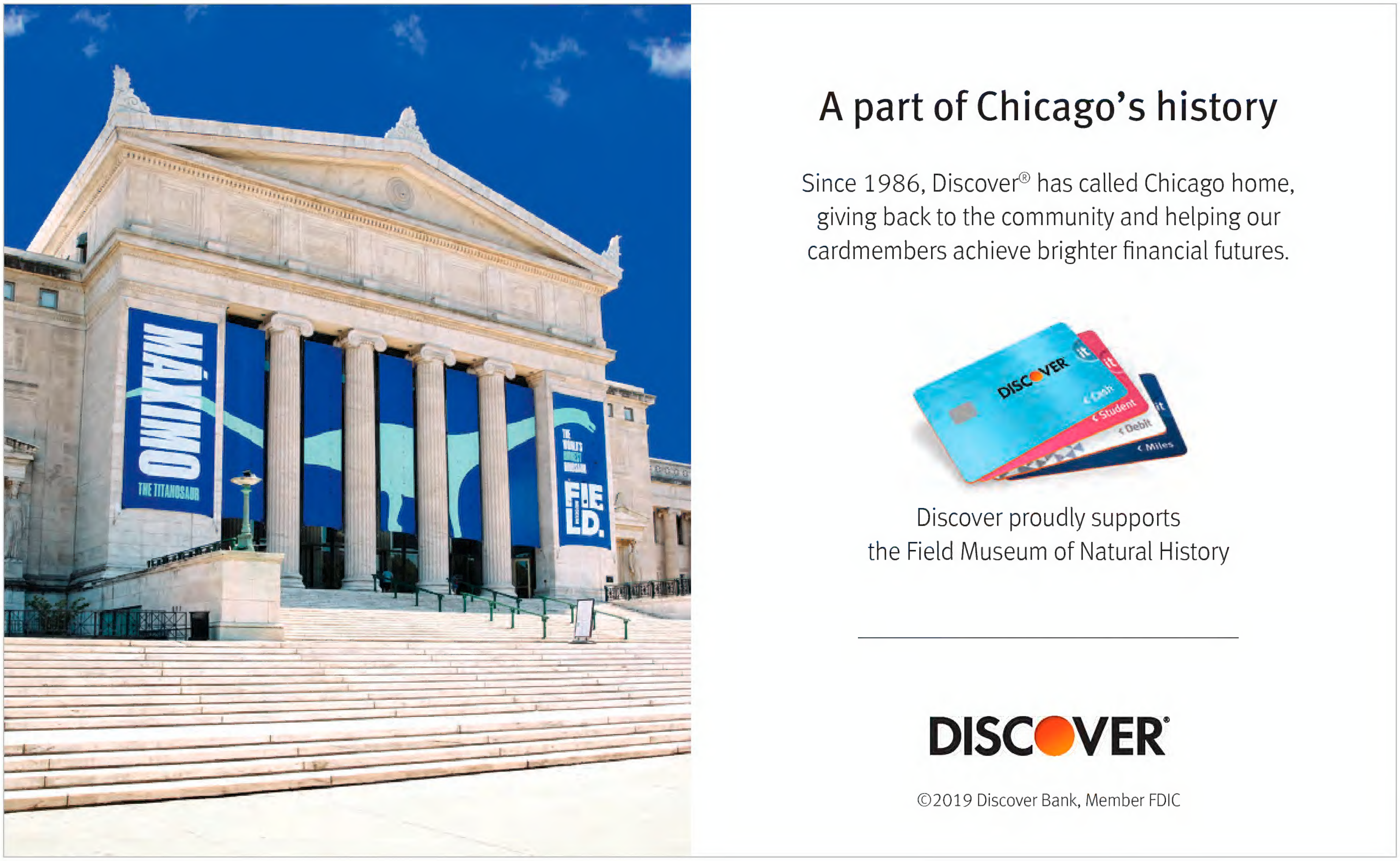

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Discover proudly supports the Field Museum of Natural History

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We're all about helping people live their best possible life, every day and around the world. Abbott is a proud supporter of the Field Museum and the Abbott Hall of Conservation.

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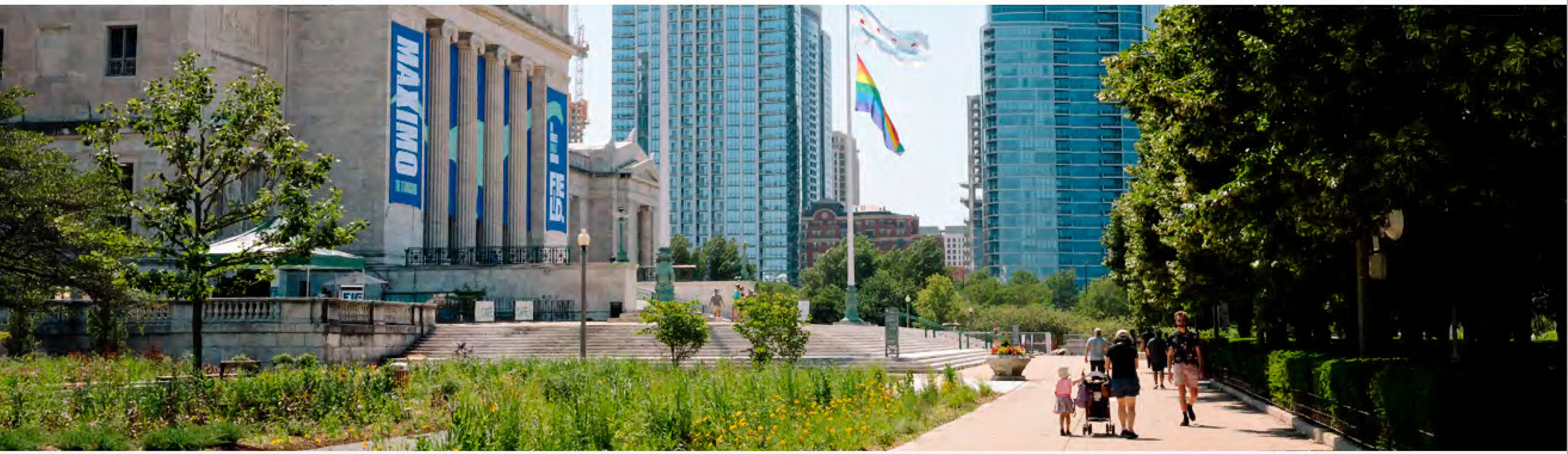

Museum Hours

The Field Museum is open Thursday through Monday from 9am to 5pm, with last admission at 4pm. The Museum will be closed on Tuesdays and Wednesdays until further notice. **For the most up to date information, parking, and public transportation options, visit fieldmuseum.org/visit.**

The Field Museum salutes the people of Chicago for their long-standing support of the Museum through the Chicago Park District

UNITED AIRLINES

Official Airline of the Field Museum

For up-to-date information for all member events, visit **FIELDMUSEUM.ORG/MEMBEREVENTS**

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WOMEN AND WARRIORS

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Special Exhibition

NOW OPEN

Apsáalooke Women and Warriors is jointly organized by the Field Museum and the Neubauer Collegium for Culture and Society at the University of Chicago.